PURPOSE BUILT CASE STUDY

Translational Research Institute

This collaboration among four institutions brought Australian scientists together to turn leading-edge research into medical innovations and spur economic growth.

Executive Summary

Organization
Translational Research Institute

Location
Brisbane, Queensland, Australia

Construction Type
New construction

Opening Date
2012

Project Area
32,000 square meters (344,445 square feet)

Total Budget
A$354 million

The Atlantic Philanthropies Investment
A$50 million ($32.2 million)

The Translational Research Institute (TRI) in Brisbane, Australia brings together more than 650 staff members from four institutions to focus on biomedical research with direct clinical application. The idea for TRI originated from the development of the first cancer-preventing vaccine at the University of Queensland—a discovery with the potential to save millions of lives and generate billions of dollars for Australia. However, a lack of infrastructure and industry partnerships stalled commercialization of the vaccine for over a decade. This delay brought national attention to the need to translate research findings into meaningful health outcomes at a time when the Queensland state government also sought to invest in industries that could attract foreign investment and create jobs.

TRI is a unique collaboration between University of Queensland, Mater Medical Research Institute, Princess Alexandra Hospital, and Queensland University of Technology. These institutions came together to create a joint venture in a home facility where all could pursue a common purpose. Through cross-disciplinary collaboration, TRI was intended to provide medical innovations in a center for research excellence that could compete on a global scale while generating new economic impact.

The TRI facility was constructed adjacent to both the Princess Alexandra Hospital's clinical trials wing and to a biopharmaceutical manufacturing plant. A hybrid funding strategy combined state and national government resources with investment from The Atlantic Philanthropies. While funding also supported a new clinical trial space embedded within the hospital, this case study focuses on the TRI research facility.

To integrate the interests of all partners, a project control group with representatives from each institution consolidated user inputs and developed a design reflecting a shared vision. The group ultimately selected an approach that emphasized seamless connections within the building. Despite a complicated construction process, TRI became fully operational in 2012, on time and under budget.

Today, TRI is known as the first "bench-to-bedside" facility in Australia and has elevated the nation's appreciation for the value of translational research. The distinctive appearance of the TRI building has attracted top biomedical researchers to Brisbane. The proximity between research, clinical trial, and biopharmaceutical manufacturing facilities has created opportunities to improve public health, sparking interdisciplinary and inter-institutional research on cancer, diabetes, HIV, and inflammatory disease.

While staff members from each institution are placed on separate floors, cross-disciplinary collaboration is an everyday way of working at TRI. The young organization has already drawn investment in translational research within Queensland and across Australia, and has brought prestige to Brisbane's biomedical industry. However, combining the visions of four large, complex organizations in one facility brought some political turmoil. Each of the partner institutions has been hesitant to relinquish autonomy and fully embrace TRI as merged enterprise.

This case study is based on research conducted by MASS Design Group in October 2015. Funded by The Atlantic Philanthropies, this case illustrates how a capital project can connect multiple disciplines and institutions to achieve new levels of scientific and economic benefit.

Purpose Built Series

Capital projects often bring lasting benefits to nonprofit organizations and the people they serve. Given this opportunity, foundations grant more than $3 billion annually to construct or improve buildings in the United States alone.[i] Each capital project affects an organization's ability to achieve its mission—signaling its values, shaping interaction with its constituents, influencing its work processes and culture, and creating new financial realities. While many projects succeed in fulfilling their purpose, others fall short of their potential. In most instances, organizations fail to capture and share lessons learned that can improve practice.

To help funders and their nonprofit partners make the most of capital projects, The Atlantic Philanthropies and the S. D. Bechtel, Jr. Foundation commissioned *Purpose Built*—a multi-faceted study by MASS Design Group, a nonprofit architecture and research firm. In 2015 and 2016, MASS conducted interviews, reviewed literature, and examined a diverse set of completed projects around the world; each project was supported by one of the above funders.

The study generated a set of core principles as well as tools for those considering or conducting capital projects:

Introducing the Purpose Built Series is an overview of the study and its core principles.

Making Capital Projects Work more fully describes the *Purpose Built* principles, illustrating each with examples.

Planning for Impact is a practical, comprehensive tool for those initiating capital projects.

Charting Capital Results is a step-by-step guide for those evaluating completed projects.

Purpose Built Case Studies report on 15 projects to illustrate a range of intents, approaches, and outcomes.

See the full *Purpose Built* series online at **www.massdesigngroup.org/purposebuilt**..

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i *Foundation Center, Foundation Maps data based on grants made in the United States, 2006-2015.*

"One challenge we face in Australia is embedding research back into clinical practice. Having a building like TRI on a hospital campus, with a whole group of scientists and clinicians working together to achieve practical outcomes for patients, reinforces the message to everybody that, in fact, research is an integral part of healthcare. With such a facility, health moves forward."

—Translational Research Institute Founding CEO Ian Frazer

Above. A public dining space within the shaded interior of the TRI building serves as a flexible work area for industry professionals.
Cover. An interior view of TRI's U-shaped courtyard façade.

Introduction

INVENTING GARDASIL

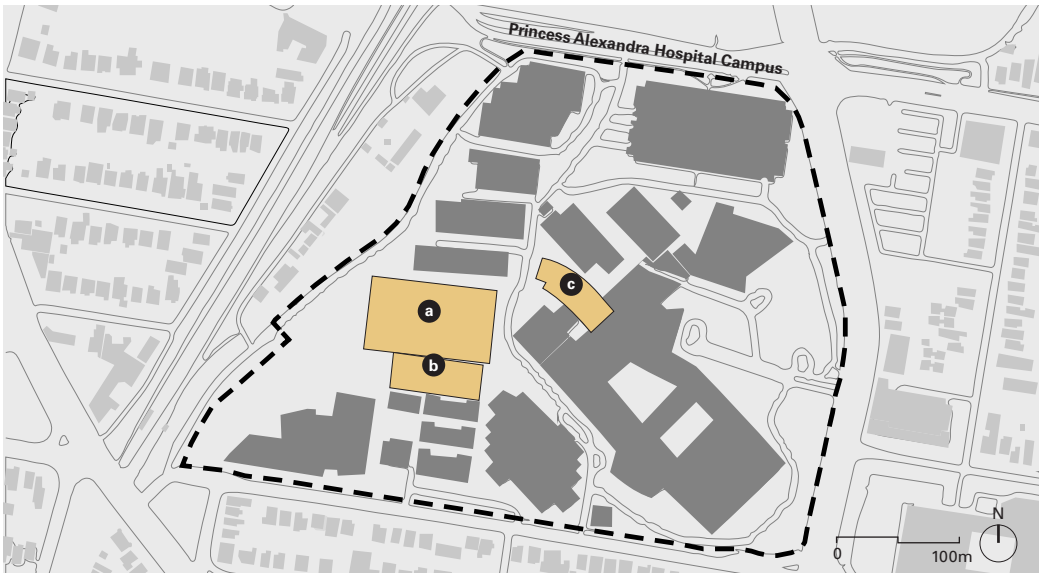
In 1990, Ian Frazer and Jian Zhou, researchers at the University of Queensland (UQ), invented the first vaccine for the human papillomavirus (HPV), an infection linked to cervical cancer. The discovery was a groundbreaking achievement in immunology.[1] The vaccine had the potential to save millions of lives and generate billions of dollars for Australia, but Queensland lacked the infrastructure and industry partnerships necessary to test and commercialize the vaccine locally.[2]

The lack of capacity for translating laboratory discovery to application in Queensland had profound health and economic consequences. For over a decade, Frazer and Zhou negotiated with multiple drug companies to commercialize the HPV vaccine.[3] The lack of local capacity meant that the drug, which became known as Gardasil, was delayed but was eventually marketed by US-based Merck & Co. in 2006.[4] Though the technology to produce Gardasil originated in 1990, patients had to wait over 15 years for the vaccine to become available and Australia lost the opportunity to capture billions of dollars. As Frazer described, commercializing the vaccine in Queensland would have expedited its release, helped develop a larger biomedical research and manufacturing industry in Queensland, and allowed Australia to benefit economically from the commercialization process.

What Queensland needed, Frazer argued, was a way to develop a regional capacity for bringing new drugs to market. He proposed that Brisbane establish a central institute for biomedical innovation that would focus on translational research, leveraging clinical application to attract commercial investment and industry. As opposed to basic science research, which studies the fundamental biological and chemical basis for disease, translational research applies basic science findings to clinical innovations targeting improved health outcomes. As Frazer described, "It was a building that Gardasil gave an argument to build."

SMART STATE

The biomedical research needs Frazer identified in Brisbane also aligned with the Queensland government's broader objectives. In 1998, Premier Peter Beattie (who was the equivalent to a state governor in the United States) launched a strategic investment program called the "Smart State" initiative, intended to shift Queensland's economic focus from mining and tourism to a knowledge-based economy that could provide more sustainable, high-paying jobs in growth industries.[5] Under the Smart State program, Queensland's government sought to invest in education, training, research, and development in the state's science, technology, and innovation sectors.



Left. Location of TRI within the Princess Alexandria Hospital Campus.

a. Translational Research Institute
b. Biopharmaceuticals Manufacturing Facility
c. Clincal Research Wing

Queensland already possessed biomedical talent across its universities, as evidenced by Frazer and Zhou's Gardasil discovery. However, researchers lacked access to the high-quality infrastructure that would allow them to compete and succeed on an international stage. Beattie recognized that the state had the potential to grow this research capacity with strategic investments in infrastructure and human capital. Beattie earmarked a subset of Smart State funding, A$100 million, for biomedical-specific investments in "Smart Therapies."

> "The goal was to create a physical environment where each of the parties could work together to a common purpose, in an integrated way."

Project Mission

The vision to create Australia's first research facility focused entirely on translational "bench-to-bedside" medical innovation aligned with the needs of Brisbane's research sector and the desire to invest in Queensland's knowledge economy. The Translational Research Institute (TRI) would bring an applied approach to biomedical innovation by focusing "observations in the laboratory, clinic, and community that turn into interventions that improve the health of individuals and the public," rather than simply the chemical and biological processes contributing to disease.[6] In doing so, TRI sought to not only bring innovations to market faster, but to establish a center of excellence that could attract talent, increase foreign investment in Brisbane, and create more sustainable jobs for Australians.

The building was intended to be more than a "research hotel" offering separate research units for four different partners. Instead, as one project team member described, "The goal was to create a physical environment where each of the parties could work together toward a common purpose in an integrated way."

The primary mission of the project—expanding and enhancing translational research—drove the selection of the site, which connected a research facility to a hospital and manufacturing space. The proximity of these spaces would allow the project partners to achieve the primary mission, join forces, and make strides in their research. A spirit of collaboration would drive many aspects of the research building design as the project unfolded.

Process

PARTNERING FOR STRONGER RESEARCH OUTCOMES

Four partner institutions ultimately came together to create the joint institution that would become TRI: University of Queensland (UQ), Mater Medical Research Institute, Princess Alexandra Hospital (PAH), and Queensland University of Technology (QUT). Initially,

two groups—UQ, led by Frazer, and a research institute at the private Mater Hospital in Brisbane—applied for the Smart Therapies funding with similar proposals for translational research facilities. Beattie refused to fund the two separate proposals, suggesting that the two research initiatives would be stronger if they used the funding cooperatively. By co-locating researchers, clinicians, and technologists from both organizations in a single building, a collaborative translational research facility could spur more interdisciplinary discoveries and keep more financial and human resources in Queensland.

Beattie's encouragement inspired more parties to join the initiative. PAH, Queensland's "foremost teaching and research hospital" was the third partner to join the venture.[7] Located across the Brisbane River from the University of Queensland, PAH was the site of Frazer and Zhou's Gardasil discovery; many UQ medical students and researchers historically used the PAH premises to conduct clinical research. PAH offered a building site on its campus, which allowed the research facility to be located in close proximity to the hospital's clinical work. An adjacent site on the campus also provided room for a biopharmaceutical manufacturing plant to be built. Upon the completion of these facilities, this arrangement would enable new drugs to move from research to clinical trials, manufacturing, and, finally, to patients.[8] Eventually, the state government approached QUT leaders to explore their desire to join the partnership. As a leading Australian university with significant interest in interdisciplinary health and medical research, QUT added an important, technology-focused component that would fast track clinical trials.

COMBINING PUBLIC AND PHILANTHROPIC FUNDS

To fund the project, a hybrid strategy combined resources from the state and national government as well as philanthropy. With a commitment of A$100 million in Smart Therapies funding from the state of Queensland, the partners began developing a design brief for their desired building and determined that an additional A$100 million was needed to cover project costs. For the remaining funding, TRI's leadership approached Charles F. "Chuck" Feeney, founder of The Atlantic Philanthropies. Through his global investment group, Feeney had interests in Brisbane and had previously funded initiatives through Atlantic at local universities and medical institutions, including UQ and QUT. Current Atlantic CEO Christopher G. Oechsli, who was the first Atlantic program officer for Australia, reflected that Brisbane had "a high intellectual capital, which was maybe under-appreciated and under-valued . . . Chuck saw good leaders, good people, and strong intellectual capacity."

In 2008, Atlantic agreed to contribute half of the needed A$100 million on the condition that the national government match its contribution. The leveraging of government funds was a preferred tactic of Feeney's, particularly in Australia, as it increased the impact of Atlantic's contribution and worked to realign government investment priorities. Kevin Rudd, prime minister of Australia at the time, recalled that Feeney was a proponent of collaboration in order to diversify funding sources and bring more committed partners to the project.

All told, the Atlantic investment of A$50 million helped to attract additional funding from public sources for construction as well as educational and research programming. This approach to leveraged funding was a hallmark of Feeney and the foundation.[9] The Australian Commonwealth—the federal government—agreed to match Atlantic's contribution of A$50 million and contributed an additional A$100 million. UQ and QUT contributed A$20 million, and some smaller sums from the National Collaborative Research Infrastructure Strategy brought TRI's total project budget to A$354 million.[10] By the time that Commonwealth and Atlantic funds were secured, the project was well underway.

ESTABLISHING A GOVERNING BODY

With many players working together to build a new organization, a cohesive governing body to manage the design and construction aspects of the project was needed. Managing the TRI building project required synthesizing inputs from across all four institutions as well as the government and funding partners. The TRI team established a project control group that included representatives from each of the four institutes as well as an independent project chairperson. The partners selected David Watson, a former Australian politician, to serve in that role.

The project control group collected input from across a variety of stakeholders, including scientific advisors, clinicians, and students. To consolidate the feedback, the TRI project team hired Ian Taylor, an experienced project manager from UQ. Taylor, who had a PhD in radiation biology, had helped lead an Atlantic-funded laboratory project at UQ a few years earlier. Project team members valued Taylor's comprehensive understanding of the project process (including building design and construction steps, functional research requirements, and the needs and interests of varying user groups), which proved to be essential to the team's collaboration and communication.

Guided by Taylor, the project control group assembled a design brief which outlined broad project goals and space planning requirements. One of its central themes was collaboration among disciplines and institutions. As Watson described, TRI wanted to encourage both formal and spontaneous encounters between researchers, from meeting for a cup of coffee to sharing lab space. According to the project team, collaborative spaces had been attempted at other research facilities in Brisbane, but had been relatively unsuccessful

because the design and layout of the spaces inhibited authentic interactions and joint work opportunities necessary for collaboration. Ultimately, the project design prioritized building spaces where researchers, clinicians, and patients could interact and share information.

SELECTING THE ARCHITECT

The project control group understood that the design of the TRI facility would be essential to meeting the objectives of facilitating translational research and fostering collaboration. As a result, the group decided to launch a six-month competition to select a project architect. Three firms were invited to participate after submitting expressions of interest. While only one team would be chosen, TRI agreed to pay A$100,000 to each firm not selected in order to ensure that the architects made a serious commitment to their proposed designs. To inform the design process, TRI provided the teams with the design brief and tours of UQ's existing research facilities.

> Rather than separating researchers into different buildings based on home institution or research area, [the] scheme emphasized connections across the facility and provided a central space for researchers to convene.

The TRI project control group selected the joint team of Wilson Architects and Donovan Hill, whose competition entry was notably different from the other two teams. While the others proposed schemes that would divide the facility into a multi-building campus, Wilson and Donovan Hill's design featured a large U-shaped building with labs and offices wrapping around an open central atrium. Rather than separating researchers into different buildings based on home institution or research area, Wilson and Donovan Hill's scheme emphasized connections across the facility and provided a central space for researchers to convene.

Once selected, the architects moved forward quickly to advance the design, meeting frequently with Taylor as well as representatives from the user groups that would occupy TRI. As the project progressed through design development, the architects and user representatives met biweekly to discuss new changes and resolve concerns.

DESIGNING TO ENCOURAGE COLLABORATION

The final 32,000-square-meter design featured eight stories, with public spaces on the ground, administrative spaces on the top floor, and laboratories and research spaces on the levels in between.[11] Upon completion, the U-shaped building would accommodate over 650 scientists as well as facilities for medical students, administrative offices, and an open-air atrium accessible to visitors from across the hospital campus.[12] A wing of the PAH building was renovated for clinical trials, and the biopharmaceutical manufacturing plant was built nearby.

The designers sought feedback from prospective users throughout the design—a process that helped to inform a functional layout that facilitated seamless and efficient collaboration between researchers. As a result, the designers proposed U-shaped floor layouts that would allow researchers to stay within a controlled environment on each level without having to remove isolation gowns. Shared laboratory spaces containing more expensive and sophisticated equipment would be strategically placed around the layout. Because TRI needed to provide resources for a flexible number of researchers, workstations throughout the labs were designed modularly so that spaces could be easily altered to host more researchers or be adapted to fit different needs. The architects built a life-sized mockup of the lab workstations, which allowed users to interact with the design and provide feedback.

The design also sought to encourage collaboration and casual interactions. Research and office areas would wrap around a covered, open-air atrium filled with lush greenery and a public café. Situated along a pedestrian path connecting the hospital campus to a nearby train station, the atrium would serve as a gathering place for research, clinical, and industry professionals as well as the broader PAH campus. Other public-facing amenities would surround the atrium on three sides: an auditorium, a teaching laboratory for outreach to local secondary school students, and spaces for UQ's School of Medicine program.

The architects selected materials and design features specifically to reinforce TRI values of collaboration and connectivity. Transparent, full-height glass walls around the periphery of the atrium would provide strong visual links to the activities on the floors above and give researchers a sense of connection to their peers throughout the work day. Gathering and circulation spaces on each floor around this accessible core would draw the focus of the building inward. This arrangement would be advantageous from an energy efficiency perspective as well. With spaces oriented to the interior atrium, the exterior façade of the building could be covered with a system of tinted glass panels to block Brisbane's harsh summer sun, helping to keep the building cool.

A COMPLEX CONSTRUCTION PROCESS

With the design complete, and funding secured from the Commonwealth government and Atlantic, construction for the project went out to bid at the end of 2009. Due to the project's timing, which coincided with the 2008 global financial crisis,

contractors returned very low bids. The winning bid was from Watpac Construction, whose offer came in A$1 million under the next lowest offer. Watpac's low construction pricing meant that TRI could invest extra money in the highest quality finishes, including features like custom light fixtures and laboratory desks, and doors made of solid wood rather than standard aluminum.

By the time Watpac was brought on, the design had already been solidified. Because the architects' work was complete, Watpac assumed all the risk for overruns on the project, which presented a major incentive for them to finish on time and on budget. However, Watpac found certain elements of the building difficult to construct, because the architectural design had not been developed with construction logistics in mind. For instance, a six-story stairwell and an overhanging roof on the building posed particular challenges to the contractors.

Overall, the construction phase was notable for its efficiency. Even with the complex construction process, the TRI building still finished A$146,000 under the expected amount. In total, the capital project cost A$354 million, which included the new TRI research building, the PAH building wing renovation for clinical trials, and the construction of the adjacent biopharmaceutical manufacturing plant. (This figure does not include costs for lighting, casework installation, and furniture in the biopharmaceutical facility.)

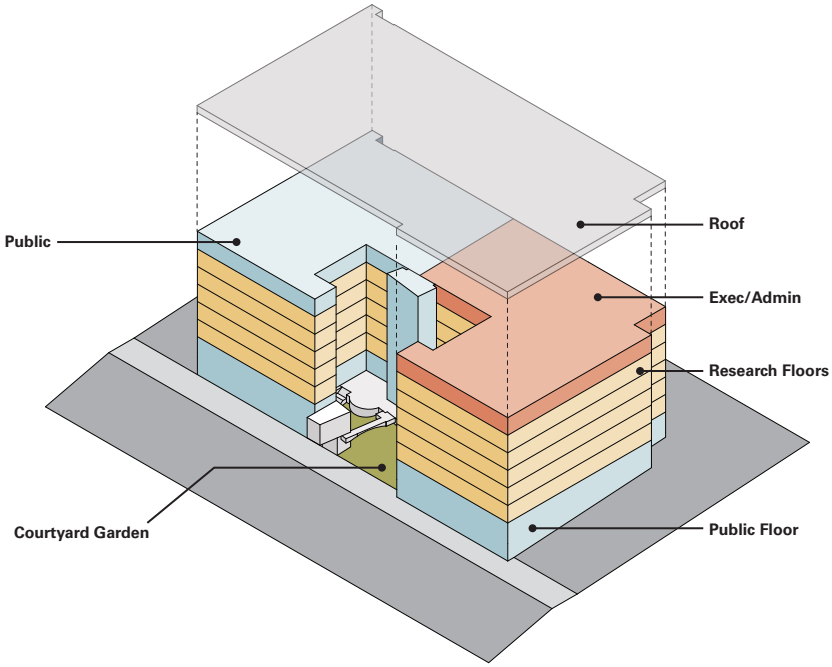
TRANSITIONING INTO AN OFFICIAL JOINT VENTURE

At the same time as the capital project was being developed, the partners established an internal group that could successfully merge multiple interests while meeting administrative and facility management needs. In 2008, when the project construction was initiated, TRI consisted of a loose agreement between the four partners. TRI's vision was to foster collaboration among researchers across fields, but the partners had not yet agreed how the organization would formally bring together researchers from across institutions. As the project progressed, however, it became clear that TRI's mission would be best supported if the four partners formed an official joint venture. Thus, only 18 months before the building opened, TRI was incorporated as its own company. Mirroring the structure of the project control group, TRI established a board of directors composed of one representative from each of the four partner institutions and one independent chair. While the project control group was responsible for overseeing the progress of the capital project, the board of directors would play an ongoing role in governing TRI.

With the newly-incorporated TRI, the board of directors began to develop a plan to integrate the common interests of the four partner institutions. Ian Frazer, appointed by the board as TRI's first CEO, was responsible for putting together the plan. Frazer set up operational committees to establish how the shareholders would have ownership over portions of the space. Under the new agreement,

Below. Research and office areas are wrapped around a covered, open-air atrium filled with lush greenery and a public café. The atrium is intended to serve as a public gathering place.

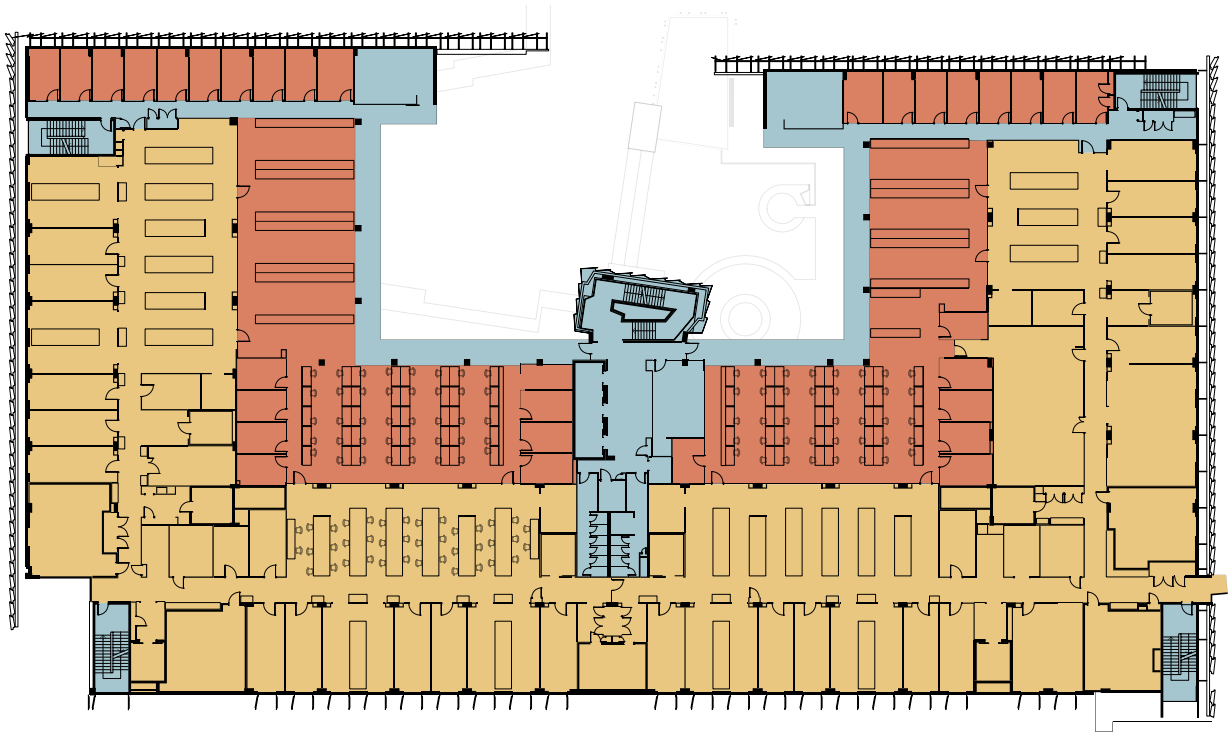
Right. The drawing shows the distribution of space by program in the TRI building.
Below. A typical plan layout of a research floor.



Admin/Desk Work

Research Labs

Public / Circulation



Above. The building's façade provides a much needed barrier to the intense heat and sun of Queensland.

partners would pay rent to cover shared TRI expenses, including administrative staffing, projects, and consumables as well as some final aesthetic touches such as lighting, casework installation, and furniture. One board member expressed that incorporating four large, bureaucratic institutions with political and historical relationships into a single company completely changed the organizational structure at TRI, remarking, "Researchers are encouraged to be involved in cross-institute programs. This helps drive a level of mixing that wouldn't otherwise have happened."

Impact

TRANSLATIONAL RESEARCH

The construction of TRI has created a physical center where teams of researchers and clinicians convene to solve health challenges, as well as a model that advances Australia's knowledge economy and the original aims of the Smart State initiative. Since opening in 2012, TRI has become home to approximately 650 researchers focusing exclusively on translational research. The building's location has facilitated new collaborations among researchers, clinicians, and industry professionals while providing a new focal point for biomedical innovation in Queensland. Additionally, Australian politicians have used the facility as a proof-of-concept for additional investments in buildings contributing to Australia's knowledge-based industries.

According to research staff, TRI's position on the PAH campus has created a new understanding and appreciation of the importance of translational research. The co-location of the hospital, research facility, and manufacturing plant offers a pathway for new drugs to be delivered from the bench to the bedside. Some researchers expressed that working for TRI fundamentally changed how they approach research. One cancer biologist explained, "It was not until it [the facility] was here, [and I began] seeing patients and clinics, that I realized that the way scientists think about clinical problems isn't right. There's a real divide between clinical research and basic research. It makes you modify the way people approach things . . . you see that some things aren't possible when they get to clinic."

In some cases, the facility's proximity to the hospital has also changed the methods and resources available to researchers. For work involving live samples, specimens typically must be shipped to a lab and often degrade by the time they arrive. Due to TRI's location, however, researchers can easily pick up samples from the hospital and carry them on ice back to their labs. According to some scientists, this access to patients has created cancer, diabetes, HIV, and other disease research opportunities that previously would have been impossible.

The triangular relationship with clinical research, lab research, and manufacturing at TRI provides a seed for further growth as new drugs are discovered. TRI has formed strong connections with the adjacent PAH hospital, but there is less of a link to the on-site biopharmaceuticals manufacturing facility, occupied by Patheon Biologics. As of 2016, no TRI members work directly with the manufacturing plant. However, given TRI's relatively recent establishment—and the fact that new drugs take an average of 12 years to be translated from initial research to patient use—this lag in collaboration with Patheon is understandable.[13] The potential

Above. The auditorium at TRI is one of the amenities accessible to the public.

for drugs to be manufactured on site is alone a significant step for Brisbane and establishes a foundation for more investment in manufacturing capacity in the future.

There are early signs of TRI's potential economic impact through its translational research initiatives. For instance, a partnership between TRI and Siemens Healthcare compelled the Queensland Government to invest $3.25 million over three years toward a new Innovation and Translation Centre. Through the Centre, Siemens works with TRI to translate Queensland innovations into its imaging systems to improve human health worldwide. With the global market for magnetic resonance imaging systems expected to reach US$5814 million by 2020, the partnership could prove to be extremely lucrative.[14]

COLLABORATION

In addition to the synergies created by co-locating clinical, research, and manufacturing spaces, TRI's design creates opportunities for people across disciplines and institutions to interact and be exposed to one another's work. Researchers have opportunities to share their work with fellow scientists and clinicians at open-access seminars in TRI's auditorium and are able to connect with peers at regular social events. Some researchers, as a result, have begun collaborating on projects with colleagues from other fields or partner institutions. The layout and common spaces provided in the building also spur casual chance encounters. TRI researchers, hospital staff, and manufacturing plant workers regularly visit the café in the atrium, creating opportunities for informal conversations between specialists.

> "Clinicians have the questions, scientists have the way to answer the questions, and clinicians have ways to integrate back into the clinic."

TRI also has created opportunities for clinicians to pursue research through a more holistic approach. As one TRI member described, clinicians are often keen to participate in research, and tend to offer different perspectives: "Clinicians have the questions, scientists have the way to answer the questions, and clinicians have ways to integrate back into the clinic." TRI's location and design encourage clinicians and researchers to establish closer relationships, changing the ways both approach research. As one TRI member described, "If you sit a scientist on one desk and a surgeon on the other desk, they learn from each other by osmosis: One learns the question and the other learns how to solve the problem."

Although TRI is sparking inter-institutional collaborations, there is more to be done to reach the project's original goal of being more than a "research hotel." In the eyes of some researchers, the TRI building has helped to facilitate more inter-institutional projects, and staff members have come to identify with both TRI and their home institutions. Researchers who affiliate strongly with TRI cited the iconic building as a significant part of this identity. However, certain logistical and administrative barriers still impede collaboration among institutions. This is a result of a lack of time and resources to gain clarity in vision between the four groups as the project unfolded. Since TRI's stakeholder politics and ownership structure were not completely resolved by the time the building opened, instead of grouping researchers by area of focus, researchers were located on different floors based on organizational affiliation. One staff member described the floors of the building as a significant barrier to inter-institutional collaboration, as moving between levels can require badge access. "I don't think [the funders] grasped how political Australia can be," said the staff member. "I think having the independence on the board and laying some ground rules over what [the partners] can and can't do otherwise [they] aren't going to get the money, would have helped smooth over a large number of bumps that we had."

> The nature of co-locating four different partners means that TRI must strike a balance between respecting each institution's autonomy, while creating a unified identity within TRI.

The young leadership team at TRI has recognized the importance of aligning the original project mission with the internal organizational structure. In the future, TRI's leadership hopes that office space can be reallocated based on research focus, rather than home institution. The nature of co-locating four different partners means that TRI must strike a balance between respecting each institution's autonomy, while creating a unified identity within TRI. Fortunately, the building's design supports this organizational flexibility, as the floors have the potential for reorganization in the future and the joint board provides a forum for finding a common solution.

CENTER OF EXCELLENCE

In the few years that TRI has been operating, the building has already begun to spark new opportunities for the biomedical industry in Brisbane, and Queensland more broadly. The unique ambiance and quality of the building, however, have resulted in both challenges as well as successes.

Because the project was completed under budget, TRI's project team was able to invest in higher quality finishes that contribute to a sense of prestige and professionalism in the building. However, this

Above. Spaces like this informal work space help to facilitate new collaborations among researchers, clinicians and industry professionals.

quality has come at a high cost of maintenance and upkeep. TRI's facilities managers described that the decisions for finishes were made without consulting experts in how the building would be maintained. Special details like wooden doors and complex light fixtures have thus increased the cost and difficulty of maintaining the building. This tradeoff between quality finishes and high maintenance costs may not have occurred had TRI's facilities managers participated earlier in the design process.

To building users, however, the caliber of research and industry partners that the building attracts has the potential to outweigh any additional burden for the facility's upkeep. Users indicated that the quality of the new facility has improved the prestige and perception of their work. Executives at both TRI's research institutions and the hospital indicated that the quality of the building and the unique nature of its occupation have helped them hire stronger employees, and faculty and students have expressed that the facility has encouraged students who work in the building to approach their work more professionally.

As a hub of expertise and a high-quality display of capability and professionalism, the TRI building has also played a major role in changing the perception of the biomedical field and attracting new industry to the state. In a few short years, TRI has become a key stop in Australia for pharmaceutical companies. In 2015, TRI appointed a new CEO, Carolyn Mountford, who will continue TRI's trajectory and bring industry connections of her own to the organization. According to Ian Frazer, who continues to be involved in the organization as TRI ambassador and chair of TRI foundation board, TRI has created a reason for industry members to come to Brisbane because of the many major research teams who work in the same building. Frazer further described TRI's significance:

> One challenge we face in Australia is embedding research back into clinical practice. Having a building like TRI on a hospital campus, with a whole group of scientists and clinicians working together to achieve practical outcomes for patients, reinforces the message to everybody that, in fact, research is an integral part of health care. With such a facility, health moves forward.

As of 2016, Australia is better poised to respond to its next big biomedical discovery—an innovation that TRI hopes will originate at its facility in Brisbane.

Conclusion

Since its founding, the Translational Research Institute has helped reorient research priorities in Brisbane with a greater applied focus on translational research, placing faster clinical application of the scientific discoveries that occur there within reach. Through an investment in a single institute, several stakeholders—the Queensland and Australian Commonwealth governments, The Atlantic Philanthropies, and four partner institutions—have created a nexus for foreign investment in biomedical innovation and commercialization in Brisbane. This collaboration has established a center of excellence that offers opportunities for biomedical researchers, clinicians, and manufacturers in the medical sector to work and interact across disciplines and institutions.

Videos

For additional information on this case study, see the following videos available at www.massdesigngroup.org/purposebuilt:

Building Research Capacity in Australia

Interdisciplinary Collaboration

Below. The open-air atrium is accessible to visitors from across the hospital campus.

Lessons from the Translational Research Institute

Envision greater possibilities for impact.

Physical proximity fuels collaboration and new approaches: The design as well as location of a capital project can be vital to facilitating its mission. In the case of the Translational Research Institute, co-locating the research facility alongside clinical and manufacturing spaces on an existing hospital campus played an important role in creating pathways for translational research. The physical proximity between TRI and the adjacent hospital has resulted in new research approaches and methods and allowed clinicians to better participate in research. By bringing together people from across a range of disciplines and institutions, TRI has also created opportunities for more formal collaborations as well as casual interactions among researchers, clinicians, and other industry professionals. According to some TRI members, the proximity, connectivity, and openness of the building have begun to change the way staff think about their own research as well as broader perceptions of biomedical research as a whole.

Invest in design excellence.

Design communicates values: A high-quality design generated through a thoughtful design process may cost more upfront but can result in a variety of long-term benefits. The project control group in charge of guiding the design and implementation of the Translational Research Institute understood that the design of the facility would be critical to its vision of facilitating translational research and fostering collaboration. As a result, the group was willing to invest time and resources in developing a design brief and compensating the architectural firms that participated in the subsequent design competition. This purposeful and thorough planning process led to a unique building design that responded to the vision and values identified for TRI. As the project progressed, the TRI team was able to invest in high-quality finishes and features, resulting in spaces and ambiances very different from those of typical laboratory facilities. However, some of these quality materials, such as the wooden doors, have increased the cost of building maintenance. Consulting facility managers throughout the design process could have helped the project team anticipate these maintenance challenges. Despite this oversight, the building's beauty and innovative atmosphere have played a role in attracting high-caliber researchers and partners, and changing the perception of biomedical research in Brisbane.

Lessons from the Translational Research Institute

Be ready for organizational change.

Incomplete organizational planning limits results: Buildings need to be paired with strong programs and organizational systems to achieve their intended impact. This includes ensuring that the physical structure supports the nature of the organization and work it contains. The creation of the TRI involved not only carrying out a major capital project, but establishing a new institutional entity and model for research. The process of incorporating TRI as a single organization required bridging the needs and agendas of four partner organizations, each with unique offerings and perspectives.

Due to the challenges of addressing the needs of multiple institutions on an accelerated project timeline, TRI's organizational structure and stakeholder politics were not completely resolved by the time the building opened. Logistical and administrative hurdles resulted in partner groups occupying different floors of the building. Although the location and design of the building are supporting research collaborations in other ways, separating researchers by organizational affiliation has limited the opportunities for accidental encounters and formal collaborations across institutions.

TRI's leadership recognizes the need to resolve this political turmoil and is working to develop a more cohesive institutional identity and administrative system. While TRI has been in operation only since 2012 and is still in the early phases of its development, it illustrates the importance of developing capital projects in alignment with programs and organizational structures.

End Notes

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p. 8 Courtesy of Russell Shakespeare/Magnum Foundation. "Open Air Atrium."

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